An Outcome Analysis of Posterior Capsular Rent (PCR) In The Hands of A Senior Phaco Surgeon

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Introduction

Posterior capsular rent is a common complication of cataract surgery including phacoemulsification. Though occurrence is higher with beginners, it can also occur in the hands of a senior phaco surgeon. This study analyses the predisposing risk factors, intraoperative events, mode of occurrence, management strategy and eventual outcome of Posterior capsular rent during phacoemulsification by a senior cataract surgeon.

Materials and Methods

This was a retrospective review of 8 consecutive patients who developed posterior capsular rent with or without vitreous disturbance during phacoemulsification over a period of 36 months from Dec 2005 to Dec 2008. Posterior capsular rent was defined as an unintended iatrogenic break in the posterior capsule occurring during any stage of phacoemulsification cataract surgery. Patients with zonular dialysis or preexisting posterior capsular rent were excluded from this study. Records of the patient and then surgical video tapes were reviewed to accumulate data concerning the nature, cause, surgical management and outcome of the surgery. All surgeries were done by a single surgeon using the Bausch and Lomb Millennium surgical unit. Preoperative work up and preparations were routine. All surgeries were done under topical or peribulbar anesthesia. Direct chop or Stop and Chop were the standard phaco techniques employed. In the event of a posterior capsular rent, a stable anterior chamber was maintained and if vitreous presented, an automated anterior vitrectomy was performed by a dry or bimanual technique. Triamcinolone acetonide staining of the vitreous was used whenever appropriate. The data analyzed from the case sheets and videos were: patient profile, associated clinical features including predisposing risk factors if any, surgical details, and intraoperative events leading to posterior capsular rent, management of the posterior capsular rent as well as the postoperative outcome.

Results

Of the 8 patients who developed posterior capsular rent, 6 were females (75%) and 2 were males (25%). (Table 1). The mean age group was 72.4 yrs (Range 48 – 87 yrs). 6 of the 8 patients (75%) had hard cataract (Grade 4 nuclear sclerosis). One patient had an intumescent cataract, 1 had pseudoxfolliation and one had undergone parsplana vitrectomy. In 3 patients visibility was poor, due to poor mydriasis in 2 and corneal opacity in 1 (Table 2) (Fig. 1).

In 6 patients, a clear corneal incision was used. In 2 patients a scleral tunnel incision and in 1 patient the incision had to be extended.

In the post parsplana vitrectomy cataract, posterior capsular rent occurred during the end stage of phaco.
In the intumescent cataract, extension of the capsulorhexis resulted in posterior capsular rent. Thus, in a total of 6 cases posterior capsular rent occurred at the end stage of phacoemulsification. Two cases had an incomplete capsulorhexis with posterior capsular rent occurring during irrigation / aspiration (Table 3).

In one case nucleus drop occurred requiring parsplana vitrectomy. Anterior vitrectomy was required in 5 cases. IOL could be inserted in the capsular bag in one case while 6 received PCIOL in the sulcus. 1 eye was left aphakic. Additional surgical procedures performed included triamcinolone acetonide (Fig 2) staining of the prolapsed vitreous to facilitate anterior vitrectomy in 4 cases, bimanual anterior vitrectomy in 5 dry vitrectomy (Fig 3), residual cortex aspiration with 26 gauge cannula in 8 and posterior capsulorhexis in 2.

All patients were evaluated on the same day of surgery, at 1 week, 2 weeks and 2 months postoperatively. Refraction was done at the 2nd week postoperatively. On the first postoperative review 4 patients had raised intraocular pressure which resolved in one week with routine single topical antiglaucoma medication. Only one patient required systemic antiglaucoma medication. 4 patients had moderate corneal edema and 2 had mild corneal edema which resolved by the second postoperative week. 75 % of the patients regained best corrected visual acuity of 6/12 or more of which 83 %

<table>
<thead>
<tr>
<th>Associated Factors</th>
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<tr>
<td>Hard cataract</td>
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<td>Intumescent cataract</td>
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<tr>
<td>Steps of Phaco End stage</td>
<td>6</td>
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<td>I / A</td>
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had vision of 6/9 or more Fig 4 a & b. One patient who had nucleus drop had a vision of less than 6/60 which could be attributed to the preexisting corneal opacity.

**Discussion**

Posterior capsular rent during phacoemulsification cataract surgery remains an important complication because it may lead to poor visual outcome. Posterior capsular rent though more common in beginners can also occur in the hands of the most experienced of surgeons.

In our study, posterior capsular rent was seen to occur in association with certain risk factors especially with hard cataract, intumescent cataracts, in the presence of pseudoexfoliation and when there was poor visibility. In uncomplicated routine cases no posterior capsular rent occurred.

Posterior capsular rent was found to occur during Irrigation Aspiration and end stage of phaco surgery in our study. Studies show that posterior capsular rent is rarer in the initial stages (capsulorhexis, hydrodissection) and mostly appears in the middle and final stages (phacoemulsification, Irrigation Aspiration, IOL implantation and posterior capsular polishing).

Gimbel et al reported that posterior capsular rent arose most frequently during phacoemulsification. While Bast et al reported 72% occurred during Irrigation Aspiration. Taskapili et al reported that posterior capsular rent most frequently occurs during phacoemulsification in 59.56% followed by Irrigation Aspiration in 28.8%.

Corneal edema is the most frequent cause of reduced vision in the early postoperative period. This is generally temporary. Varying rates of corneal edema ranging from 11.6 - 59% had been reported.

High postoperative IOP is another complication reported in patients with posterior capsular rent. Viscoelastic material remaining in the anterior chamber, preoperative glaucoma, trabecular blockage by dispersed lens particle and iris pigments and mechanical damage in the trabecular meshwork may lead to this postoperative event. In our study 50% developed raised IOP compared to other studies which reported 13-40 percent.

The most serious complication of posterior capsule rent is retinal detachment. Rates of up to 3.57 percent have been reported. In our study no patient developed retinal detachment during the followup period.

Cystoid macular edema is another complication of posterior capsular rent which can cause decreased visual acuity. Its incidence varies from 7.86 percent - 16.7 percent in different studies. In our study no patient developed cystoid macular edema. This may be due to proper management of posterior capsular rent minimizing the vitreous loss. There may have been cases of cystoid macular edema in our series which eventually resolved without being diagnosed clinically.

With proper and timely management, the final visual acuity of our patients were comparable with those in other reports which cite 95% of cases achieved 6/12 or better visual acuity. 75% of our patients had a visual acuity of 6/12 or more of which 83% had vision of 6/9 or more. Thus, when properly managed a torn posterior capsule is compatible with an excellent visual outcome.

**Early Recognition of Zonular or Posterior Capsular Rupture**

If a posterior capsular tear is not recognized in time, subsequent intraocular maneuvers required for phacoemulsification (viz. nuclear rotation, sculpting, cracking) and fluctuations in anterior chamber depth will quickly enlarge the size of the tear. The risks of vitreous loss and dropped nucleus increase, longer the rupture goes unrecognized. Early recognition of a posterior capsular tear and prompt prophylactic measures will prevent expansion of the tear size.

Signs of early posterior capsular tear or zonular dehiscence include the following:

- Sudden deepening of the anterior chamber with momentary dilatation of the pupil.
- Sudden transitory appearance of a clear red reflex peripherally
- Newly apparent inability to rotate a previously mobile nucleus
- Excessive lateral mobility or displacement of the nucleus and loss of nucleus followability.
- Excessive tipping of one pole of the nucleus
- Partial descent of the nucleus into the anterior vitreous space

Early recognition of a posterior capsular rent and proper management ensures excellent visual outcomes.

References